**Class- X Session - 2022-23**

**Subject - Science (086)**

**Sample Question Paper - 5**

**with Solution**

**Max. Marks: 80** **Time Allowed: 3 hours**

**General Instructions:**

i. *This question paper consists of 39 questions in 5 sections.*
ii. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
iii. ***Section A** consists of 20 objective type questions carrying 1 mark each.*
iv. ***Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.*
v. ***Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words*
vi. ***Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*
vii. ***Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

## Section A

1. Which one of the following four metals would be displaced from the solution of its salts by the other three metals? **[1]**

   a) Mg b) Ag

   c) Cu d) Zn

2. Heating of ferrous sulphate is a type of: **[1]**

   a) Decomposition reaction b) Displacement reaction

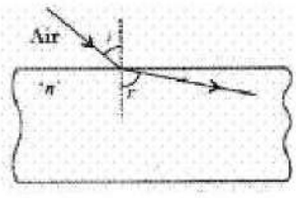
   c) All of these d) Combination Reaction

3. By how much atomic mass unit successive members of a homologous series vary? **[1]**

   a) Sixteen b) Twelve

   c) Fourteen d) One

4. The value of n for the incident ray through air medium is: **[1]**




   a) > 3 b) < 1

   c) = 1 d) > 1

5. A trait in an organism is influenced by **[1]**

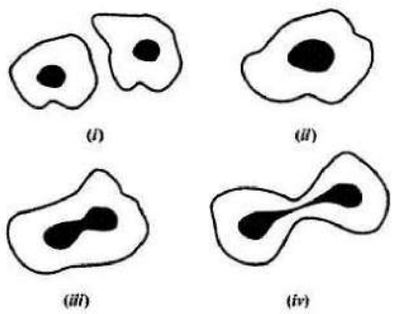
a) Both maternal & Paternal DNA
b) Paternal DNA only
c) Neither maternal nor paternal DNA.
d) Maternal DNA only

6. A student has to do the experiment, on finding the focal length of a given concave mirror, by using a distant object. Out of the following setups (A, B, C, D) available to her **[1]**

A. a screen, a mirror holder and a scale
B. a mirror holder, a screen holder and a scale
C. a screen holder and a scale
D. a mirror holder and a screen holder

a) D
b) C
c) A
d) B

7. The following figures illustrate binary fission in Amoeba in a correct sequence: The correct sequence is **[1]**




a) (i), (iii), (iv), (ii)
b) (iii), (iv), (ii), (i)
c) (ii), (iii), (iv), (i)
d) (iv), (iii), (ii), (i)

8. **Statement A:** There are 31 pairs of cranial nerves and 12 pairs of spinal nerves. **[1]**
**Statement B:** Ethylene inhibits growth.

a) Statement A is true, B is false
b) Neither statement A nor statement B is true
c) Statement B is true, A is false
d) Both the statement A and B are true

9. In grasshopper, gaseous exchange takes place through _____. **[1]**

a) Lungs
b) Trachea
c) Spiracles
d) Gills

10. What is the function of glucagon? **[1]**

a) Decrease the blood sugar
b) All of these

c) Regulate the metabolism of fat
d) Increase the blood sugar

11. The ratio of HCl and $HNO_3$ in Aqua Regia is: **[1]**

a) 3 : 2
b) 3 : 1
c) 1 : 3
d) 2 : 3

12. The two phases covering the first half and second half of the menstrual cycle are **[1]**

a) Secretory phase, ovulalion
b) Proliferative phase, ovulation
c) None of these
d) Proliferative phase, secretory phase

13. Upon observing slides showing stages of reproduction in Amoeba and Yeast, the student reported the following observations. The correct observations are: **[1]**

A. Cytokinesis was seen in the yeast cell.
B. A chain of buds was seen due to reproduction in Amoeba.
C. In Amoeba, the elongated nucleus was dividing to form two daughter nuclei.
D. Single cells of Amoeba and Yeast were undergoing binary fission and budding respectively.

a) C and D only
b) A, C and D only
c) A and B only
d) B only

14. The hardness of water is caused by: **[1]**

a) All of these
b) $Mg(HCO_3)_2$
c) $CaCl_2$
d) $CaSO_4$

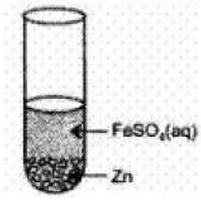
15. Carbon exists in the atmosphere in the form of **[1]**

a) coal
b) carbon dioxide only
c) carbon monoxide in traces and carbon dioxide
d) carbon monoxide only

16. **Assertion (A):** When common salt is kept open, it absorbs moisture from the air. **[1]**
**Reason (R):** Common salt contains magnesium chloride.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

17. On adding zinc granules to freshly prepared ferrous sulphate solution, a student observes that **[1]**




a) a dull brown coating is formed

b) a greyish black coating is formed

c) a white coating is formed

d) no coating is formed

18. **Assertion (A):** Voltmeter is always connected in parallel across the circuit while measuring the potential difference. **[1]**
**Reason (R):** As the voltage in parallel circuits are measured to be the same.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** When zinc is added to a solution of iron (II) sulphate, no change is observed. **[1]**
**Reason (R):** Zinc is more reactive than iron.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** In woody plants, gaseous exchange occurs through lenticels. **[1]**
**Reason (R):** Lenticels are specialised cells found along with stomata on the stem of woody plants.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

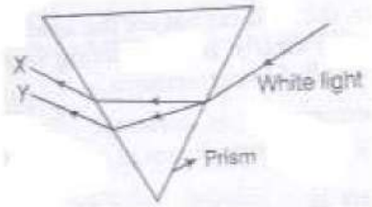
c) A is true but R is false.

d) A is false but R is true.

## Section B

21. What is the dam? Why do we seek to build large dams? While building large dams, which three main problems should particularly be addressed to maintain peace among local people? Mention them. **[2]**

22. When a beam of white light is passed through a triangular glass prism, it gets dispersed into its seven colour components. Why do we get these colours? In the given figure, the colours X and Y represent the extreme components of the spectrum. Identify X and Y. **[2]**



OR

Name the phenomenon responsible for

i. advance sunrise

ii. colour of water in deep sea

iii. twinkling of stars

iv. reddish appearance of the Sun at the time of sunrise and sunset.

23. What is meant by power of a lens? Write its SI unit. A student uses a lens of focal length 40 cm and another of -20 cm. Write the nature and power of each lens. **[2]**

24. How do the guard cells regulate opening and closing of stomatal pores? **[2]**

25. Consider the following organic compounds: **[2]**
$CH_3OH$, $C_2H_5OH$, $CH_3COCH_3$, $CH_3COOH$, $C_2H_5COOH$, $C_4H_9COOC_2H_5$, $CH_4$, $C_2H_6$, $CH_3CHO$, HCHO Out of these compounds:

a. Which compound is most likely to be sweet-smelling?

b. Which compound on treatment with conc. $H_2SO_4$ at $170^oC$ forms an alkene?

c. Which compound on repeated chlorination forms chloroform?

d. Which compound is added to alcohol to denature it?

e. Which compound is a constituent of vinegar?

26. Describe an activity to show that acid solution in water conducts electricity. **[2]**

## Section C

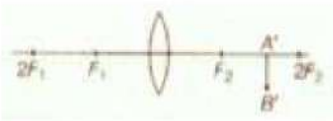
27. We do not clean ponds or lakes, but an aquarium needs to be cleaned. Why? **[3]**

28. A zinc plate was kept in a glass container having copper sulphate solution. On examining it was found that the blue colour of the solution is fading slowly. After a few days when the zinc plate was taken out of the solution, a number of small holes were noticed in it. State the reason and give chemical equation of the reaction involved. **[3]**

29. Differentiate between virtual image formed by a concave mirror and of a convex mirror. **[3]**

OR

Observe the following incomplete ray diagram of an object where the image A'B' is formed after refraction from a convex lens.




On the basic of above information fill in the blanks.

i. The position of object AB would have been...

ii. Size of the object would have been ... than the size of image.

30. How can changes of size of eyeball be one of the reason for **[3]**

i. myopic and

ii. hypermetropic eye?
Compare the size of eyeball with that of a normal eye in each case. How does this changes of size affect the position of image in each case?

31. In each of the following situations what happens to the rate of photosynthesis? **[3]**

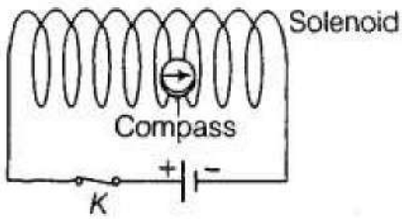
i. Cloudy days

ii. No rainfall in the area

iii. Good manuring in the area

iv. Stomata get blocked due to dust

32. A plotting compass is placed inside a solenoid and the compass needle is pointing in the direction as shown. **[3]**




i. Complete the diagram by drawing arrow heads to indicate the direction of the current flow.

ii. Describe the direction of the magnetic field inside the solenoid.

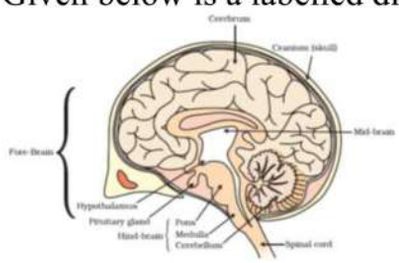
33. An individual may have a good health even when the whole of reproductive system is removed. What then is the function of the reproductive system? **[3]**

OR

DNA copies generated during reproduction will be similar but may not be identical to the original. justify this statement.

## Section D

34. Given below is a labelled diagram of the human brain. **[5]**



Using the given diagram, answer the following questions:

i. Which part of the brain controls reflex movements of the head, neck, and trunk?

ii. Name the part of the human brain which contains a vital centre for controlling blood pressure.

iii. Which part of the hindbrain regulates respiration?

iv. How is the brain protected from injuries and shock?

v. Which part of the human brain is the main thinking region?

OR

a. Why is the use of iodised salt advisable? Name the disease caused due to deficiency of iodine in our diet and state its one symptom.

b. How do nerve impulses travel in the body? Explain.

35. Describe an experiment of illustrate the action of an electric fuse. **[5]**

36. What happens when baking powder is added to the dough? Write the reaction also. **[5]**

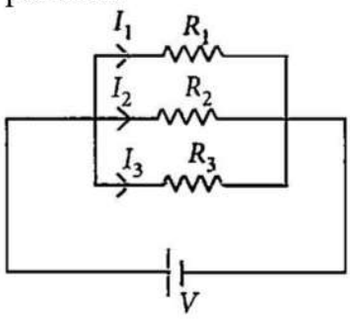
OR

Give the name of raw materials that are required for the manufacture of washing soda. Write the reaction involved in the process.

## Section E

37. **Read the text carefully and answer the questions:** **[4]**

If two or more resistances are connected in such a way that the same potential difference gets applied to each of them, then they are said to be connected in parallel.

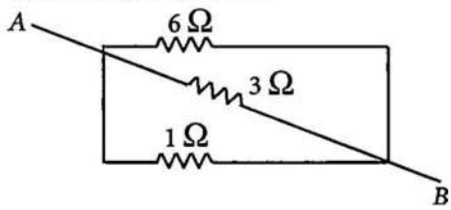



The current flowing through the two resistances in parallel is, however, not the same. When we have two or more resistances joined in parallel to one another, then the same current gets additional paths to flow and the overall resistance decreases.

(i) Three resistances, 2 Ω, 6 Ω and 8 Ω are connected in parallel, then what will be the equivalent resistance?

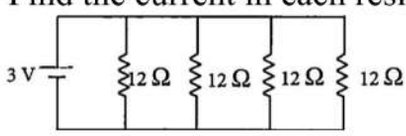
(ii) A wire of resistance 12Ω is cut into three equal pieces and then twisted their ends together, then what will be the equivalent resistance?

(iii) Three resistances are connected as shown. Calculate the equivalent resistance between A and B?




**OR**

Find the current in each resistance.




38. **Read the text carefully and answer the questions:** **[4]**

When the fats and oil present in the food material get oxidized by the oxygen (of air), their oxidation products have unpleasant smells and tastes. Due to this taste of food material containing fats and oil change and become very unpleasant. The

condition produced by aerial oxidation of fats and oils in food marked by unpleasant smell and taste is called rancidity. Rancidity spoils the food material prepared in the fats and oils which have been kept for a considerable time and makes them unfit for eating.

The development of rancidity in food can be prevented in the following ways-

i. Rancidity can be prevented by adding an antioxidant to foods containing fats and oils.

ii. Rancidity can be prevented by packaging fat and oil-containing food in Nitrogen gas.

iii. Rancidity can be prevented by keeping food in a refrigerator.

(i) What do you understand by oxidation?

(ii) How does the food become rancid?

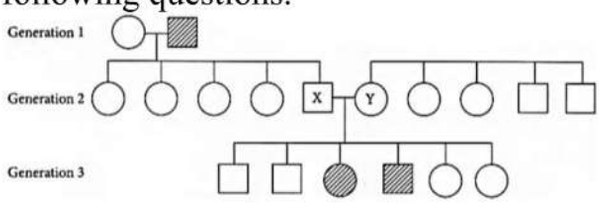
(iii) How can we prevent the rancidity of food?

**OR**

Which type of food material gets spoiled by the phenomenon of rancidity?

39. **Read the text carefully and answer the questions:** **[4]**

Refer to the schematic representation of albinism which is an inherited condition caused by a recessive allele (a). 'A' is the dominant allele for the normal condition. The inheritance of certain genetic traits for two or more generations is represented in a pedigree or family tree. Study the given pedigree chart and answer the following questions.




(i) What could be the genotypes of X and Y?

(ii) What could be the genotype of generation - 1 male and female?

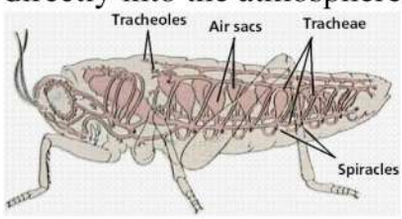
**OR**

If X married an albino female, then what is the probability that their children would be albino?

# Solution

## Section A

1. **(b)** Ag
   **Explanation:** In a displacement reaction, a more reactive metal of the activity series can displace a less active one in its salt solution. Reactivity order is:
   Mg>Zn>Cu>Ag.
   Thus, we see that Ag is least reactive and of the given four metals, Ag would be displaced from the solution of its salts by the other three metals.
2. **(a)** Decomposition reaction
   **Explanation:** Decomposition reaction
3. **(a)** Sixteen
   **Explanation:** Sixteen
4. **(b)** < 1
   **Explanation:** As light enters a rarer medium from a denser medium, it will bend away from the normal.
5. **(a)** Both maternal & Paternal DNA
   **Explanation:** As during fertilisation, sperm only gives nucleus, but ova gives nucleus as well as cytoplasm. Therefore, the mitochondrial DNA and other cytoplasmic factors are inherited directly from mother. there are some traits which are exclusively linked with Y-chromosome and they are inherited by the male child directly from father.
6. **(d)** B
   **Explanation:** The mirror and the screen should be firmly placed for an accurate measure of the separation.
7. **(c)** (ii), (iii), (iv), (i)
   **Explanation:** Nucleus divides first and then the cytoplasm, when Amoeba undergoes fission. Single cell, nucleus splits, followed by cell splitting into two daughter cells.
8. **(c)** Statement B is true, A is false
   **Explanation:**
   - There are 8 pairs of cervical spinal nerves, 12 pairs of thoracic spine nerves, 5 pairs of lumbar spine nerve, 5 sacral nerve pairs, and 1 coccygeal nerve that does not come as a pair, this totals up to 31.
     There are 12 pairs of cranial nerves.
   - Ethylene inhibits cell division, DNA synthesis, and growth in the meristems of roots.
9. **(c)** Spiracles
   **Explanation:** The exchange of gases in a grasshopper happen through the tracheal system but begins at the spiracles where air is taken in first. This system contains of ten spiracles located in the abdominal area and the others are thoracic. Oxygen diffuses into cells directly into the atmosphere and that completes the grasshopper's process of respiration.




10. **(d)** Increase the blood sugar
    **Explanation:** Glucagon hormone is released from the pancreas that increases the sugar level in the blood to facilitate the need for sugar in our body.

11. **(b)** 3 : 1
**Explanation:** The ratio of HCl and $HNO_3$ in Aqua Regia is 3:1. Aqua regia is a yellow-orange fuming liquid, so named by alchemists because it can dissolve the noble metals - gold and platinum.
12. **(d)** Proliferative phase, secretory phase
**Explanation:** The first phase is the proliferative phase and the second phase is the secretory phase.
13. **(a)** C and D only
**Explanation:** In Amoeba, the nucleus divides, first then cytoplasm to form daughter nuclei. This is binary fission. Budding takes place in yeast.
14. **(a)** All of these
**Explanation:** The **hardness of water** is caused by magnesium and calcium salts. Calcium and magnesium dissolved in water are the two most common minerals that make water hard. Temporary hardness is a type of water hardness caused by the presence of dissolved bicarbonate minerals (calcium bicarbonate and magnesium bicarbonate).
15. **(b)** carbon dioxide only
**Explanation:** Carbon exists in the atmosphere in the form of carbon dioxide gas ($CO_2$) in the air (only 0.03%). Carbon also occurs in the earth's crust in the form of minerals likes carbonates. It also occurs in the form of fossil fuels, organic compounds, wood, cotton, and wool, etc.
16. **(a)** Both A and R are true and R is the correct explanation of A.
**Explanation:** Magnesium chloride present in common salt is deliquescent i.e., it absorbs moisture from the air when kept in open.
17. **(b)** a greyish black coating is formed
**Explanation:** The colour of the coating is grayish black. When Zinc Reacts with ferrous sulphate zinc displaces iron forming zinc sulphate and iron metal is precipitated and settles on the surface of zinc granules. This is because zinc is more electropositive than iron so it can displace iron from its solution. Also, the solution turns colourless from light green.
$FeSO_4\,(aq) + Zn\,(s) \rightarrow ZnSO_4\,(aq) + Fe\,(s)$
*Black*
18. **(a)** Both A and R are true and R is the correct explanation of A.
**Explanation:** Voltage measured in the parallel circuits are always equal. As all the parallel circuits start from one point and end at another point and always the potential difference between the two points will always be the same. So, this is the reason why voltmeter is always connected in parallel across the circuit. Thus, both assertion and reason are true and reason is the correct explanation of assertion.
19. **(d)** A is false but R is true.
**Explanation:** Zinc being more reactive than iron displaces iron from iron (II) sulphate solution.
Thus, the green color of the solution fades and iron metal gets deposited.
$\underset{\text{Zinc}}{Zn(s)} + \underset{\text{Green}}{FeSO_4(aq)} \longrightarrow \underset{\text{Colourless}}{ZnSO_4(aq)} + \underset{\text{(Iron deposit)}}{Fe(s)}$
20. **(c)** A is true but R is false.
**Explanation:** In woody plants, gaseous exchange occurs through the small pores found on stems called lenticels. Stomata on the stem aid in gaseous exchange, in herbaceous plants.

**Section B**

21. The dam is a barrier that is built across a river or a stream for storage of water.
We seek to build large dams because it can ensure the storage of an adequate amount of water for irrigation and also for generating electricity.

The three main problems are an economical problem, environmental problem, and ecosystem problem.

22. i. Different colours of light bend through different angles with respect to the incident ray as they travel with different speeds while passing through a prism, this phenomenon is known as disperson of light.
    ii. X = violet, this colour has minimum wavelength thus suffers maximum deviation, Y = red, as it has maximum wavelength and thus least deviated.

    OR

    i. Atmospheric refraction is responsible for advanvced sunrise.
    ii. Scattering of light is responsible colour of water in deep sea.
    iii. Atmospheric refraction causes twinkling of stars.
    iv. Scattering of light leads to reddish appearance of sky during sunset and sunrise.
23. Power of lens:- It is the measurement of degree of convergence and divergence of a lens. Numerically, it is equal to the reciprocal of the focal length of a lens.

    $P = \frac{1}{f(in\ metres)}$

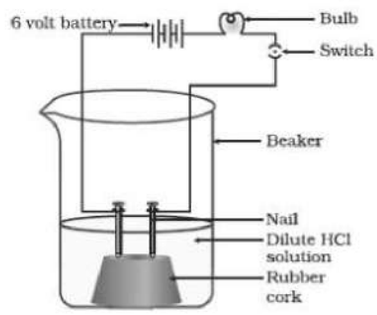
    The SI unit of power is dioptre 'D'

    Power of $1^{st}$ lens $P_1 = \frac{100}{f1} = \frac{100}{40cm} = +2.5D$

    Nature of lens: Converging lens / Convex lens

    Power of $2^{nd}$ lens $P_2 = \frac{100}{f2} = \frac{100}{-20cm} = -5D$

    Nature of lens: Diverging lens / Concave lens
24. The swelling of guard cells due to osmosis of water causes opening of stomatal pores while shrinking of guard cells closes the pores. Opening and closing of stomata occurs due to turgor changes in guard cells. When guard cells are turgid, stomatal pore is open while in flaccid conditions, the stomatal aperture closes.
25. a. $C_4H_9COOC_2H_5$; Ester
    b. $C_2H_5OH$; Alcohol forms ethene, $C_2H_4$
    c. $CH_4$; Methanol
    d. $CH_3OH$; Methanol
    e. $CH_3COOH$; Acetic acid
26. Solution of HCl is taken in the beaker and a cork with two nails fixed on it, is put in this beaker. The nails are connected to the two terminals of a 6 V battery through a bulb and a switch as shown in the fig.




    Now switch on the current. The bulb is found to glow.

    This shows that HCl in aqueous media forms $H^+$ ions which are responsible for electrical conductance in the solution.

**Section C**

27. An aquarium is an artificial and incomplete ecosystem in contrast to a pond/lake which are natural, self-sustaining and complete ecosystems. Ponds and lakes have their own cleaning mechanisms because of presence of various microorganisms but Aquarium lacks

decomposer microbes which convert the complex organic compounds of dead organisms into simple substances that can be reused by plants. Hence the dead fishes of the aquarium are not decomposed. so it needs regular cleaning.

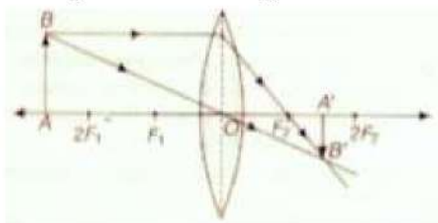
28. Zinc is more reactive than copper. Hence, when a zinc plate is kept in a solution of copper sulphate, it slowly displaces copper from the solution and blue colour of the solution keeps fading away. Because of zinc going into solution as zinc sulphate, a number of holes are seen in the zinc plate. The reaction is

$$\underset{Blue}{CuSO_4(aq)} + Zn(s) \rightarrow \underset{Colourless}{ZnSO_4(aq)} + Cu(s)$$

29. The virtual image formed by a concave mirror is always magnified whereas the virtual image formed by a convex mirror is diminished.

OR

i. The position of object AB would have been beyond $2F_1$.




ii. Size of the object would have been bigger than the size of image.

30. i. The eye suffering from myopia or short-sightedness, has long eyeball than that of normal eye due to which the retina is at a larger distance from the eye lens thus image formation occurs before retina rather than onto it.

ii. The eye suffering from hypermetropia or long-sightedness has short eyeball than that of normal eye due to which the retina is at smaller distance from the eye lens thus, the formation of the image occurs behind the retina and not on retina.

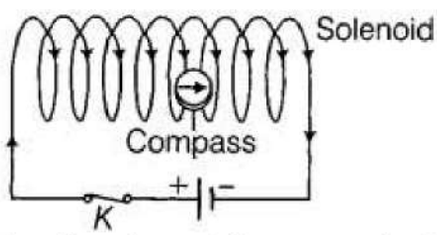
31. i. **Cloudy days:** The rate of photosynthesis during cloudy days decreases due to less light intensity of light which is one of the essential element for it.

ii. **No rainfall in the area:** The rate of photosynthesis decreases in no rainfall area as water is one of the main raw material needed by plants for photosynthesis. Water also brings other nutrients along with it. If there is no rainfall in an area, there will be less water available to plants resulting in the decrease of photosynthesis process

iii. **Good manuring in the area:** The rate of photosynthesis will increase because plants need raw minerals such as N, P, Fe, Mg etc., for performing the various functions as well as for their growth. They take these minerals from the soil along with the water in dissolved form so Good manuring in the area increase the amount of these minerals in the soil and also help them to provide micro as well as macro nutrients thus, increasing the rate of photosynthesis.

iv. **Stomata get blocked due to dust:** Blockage of stomata will reduce the rate of photosynthesis because blockage will affect availability pf Carbon-di-oxide.

32. i.




ii. The direction of the magnetic field inside the solenoid always points from the induced South pole towards the induced North pole.

33. The main function of the reproductive system is to produce the gametes for the sexual reproduction. Reproductive system is not necessary for the survival of the individual. So

even if reproductive system is fully removed, the persons may have a good health. That is why the persons who are sterile cannot reproduce but can survive.

OR

DNA copies generated will be similar, but may not be identical to the original as some variation are so drastic that new DNA copy cannot work with the cellular apparatus it inherits. Such a newborn cell will simply die. Therefore, there could be many other variations in the DNA copies that would not lead to such a drastic outcome. Thus, the surviving cells are similar but slightly different from each other. This tendency of variation during reproduction is the basis for evolution.

**Section D**

34. i. The midbrain controls the reflex movements of the head, neck, and trunk in response to visual and auditory stimuli.
    ii. The medulla contains a vital centre for controlling blood pressure, respiration, swallowing, salivation, vomiting, sneezing, and coughing.
    iii. Pons regulates respiration.
    iv. The brain is protected by a bony box called cranium, within that three layers of fluid-filled membranes called meninges are present for absorbing shock.
    v. The forebrain is the largest part of the brain and is the main thinking region.

    OR

    a. Iodised salt is advisable because Iodine present in iodised salt is essential for functioning of thyroid and formation of thyroxine hormone. The disease caused due to deficiency of iodine is Goitre. The symptom due to goitre is Swollen neck.
    b. Nerve impulses travels from dendrite to cell body, then along the axon to its end. At the end, some chemicals are released which fill the gap of synapse, and starts a similar electrical impulse to another neuron and the impulse further travel in the body.
35. **Safety Fuse or fuse :** Usually the wire chosen for electric circuit are such that these allow a certain maximum current to pass through them without excessive heating of the circuits. However, incidentally there is a short-circuiting or over-loading, the current exceeds this maximum permissible value. The wires may get over-heated and catch a fire. Sparking at the points of short-circuit may also cause fire. Many precautions and safety measures are taken to protect the circuits against damage due to over-heating. All wirers used in electric circuits are coated with layer of insulating materials. In addition these are coated with rubber or plastic layer.

    The most important safety device used these days is safety fuse or fuse. Fuse is a piece of wire of a material with a low melting point. Good fuse wire is always made of pure tin but cheaper variety is made of alloy of tin and copper or tin and lead (63% tin and 37% lead) Fuse is always connected to the live wire. When current of value more than maximum permissible is passed through the circuit, the fuse wire melts due to excessive heating. This way the circuit is broken to ensure safety of the circuit. It is due to this fact that the fuse is usually called safety fuse. The thickness, length and material of the fuse wire depends upon the maximum current permitted through the circuit. For proper protection, a fuse of proper value is must. Fuse of improper rating is a curse instead of being a safety device.
36. Baking powder is a mixture of baking soda and a mild edible acid such as tartaric acid. When baking powder mixes with water then sodium hydrogen carbonate reacts with tartaric acid to evolve carbon dioxide gas. This gas makes the dough rise and makes it soft and spongy.

    **Chemical reaction of baking soda and acid:**

    $NaHCO_3 + H^+ \rightarrow Na^+ + H_2CO_3$

    $H_2CO_3 \rightarrow H_2O + CO_2$

OR

Raw materials : Sodium chloride (NaCl), Ammonia ($NH_3$), Lime stone ($CaCO_3$)

Reaction:

$NaCl + NH_3 + H_2O + CO_2 \rightarrow NH_4Cl + NaHCO_3$

Ammonium Chloride — Sodium hydrogen carbonate

$2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + H_2O + CO_2$

Sodium hydrogen carbonate — sodium carbonate

$Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3.10H_2O$

Sodium carbonate Washing soda

$CaCO_3 \xrightarrow{Heat} CaO + CO_2$

Limestone Quick lime

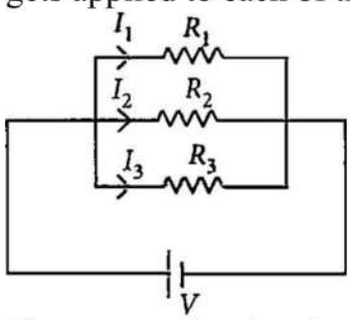
$CaO + H2O \rightarrow Ca(OH)2$

$Ca(OH)_2 + 2\ NH4Cl \rightarrow NaCl_2 + 2NH_3 + 2H_2O$

**Section E**

37. **Read the text carefully and answer the questions:**

If two or more resistances are connected in such a way that the same potential difference gets applied to each of them, then they are said to be connected in parallel.




The current flowing through the two resistances in parallel is, however, not the same. When we have two or more resistances joined in parallel to one another, then the same current gets additional paths to flow and the overall resistance decreases.

(i) The equivalent resistance in the parallel combination is lesser than the least value of the individual resistance.

The equivalent resistance of parallel combinations

$\frac{1}{Rp} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$

$\Rightarrow$ Rp = $\frac{8}{7}\Omega$

Thus equivalent resistance is less than $2\Omega$.

(ii) Resistance of each piece $= \frac{12}{3} = 4\Omega$

$\frac{1}{R_p} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} \Rightarrow R_p = \frac{4}{3}\Omega$

(iii)All the three resistors are in paralle.

$\therefore \frac{1}{R_p} = \frac{1}{6} + \frac{1}{3} + \frac{1}{1} = \frac{1+2+6}{6} = \frac{9}{6}\ R_P = \frac{6}{9} = \frac{2}{3}\Omega$

OR

All are in parallel.

$\frac{1}{R_p} = \frac{1}{12} \times 4 = \frac{1}{3} \Rightarrow R_p = 3\Omega$

$I = \frac{3}{3} = 1$ A

So, current in each resistor $I' = \frac{3}{12} = \frac{1}{4}$ A

38. **Read the text carefully and answer the questions:**

When the fats and oil present in the food material get oxidized by the oxygen (of air), their oxidation products have unpleasant smells and tastes. Due to this taste of food material containing fats and oil change and become very unpleasant. The condition produced by aerial oxidation of fats and oils in food marked by unpleasant smell and taste is called rancidity. Rancidity spoils the food material prepared in the fats and oils which have been kept for a considerable time and makes them unfit for eating.

The development of rancidity in food can be prevented in the following ways-

i. Rancidity can be prevented by adding an antioxidant to foods containing fats and oils.
ii. Rancidity can be prevented by packaging fat and oil-containing food in Nitrogen gas.
iii. Rancidity can be prevented by keeping food in a refrigerator.

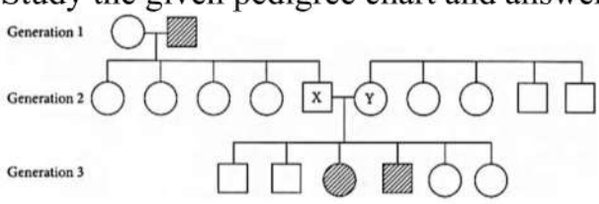
(i) The process in which the addition of Oxygen and removal of hydrogen to a substance take place is called oxidation.
(ii) Food becomes rancid when fat and oils present in the food are oxidised.
(iii) Rancidity can be prevented by packaging fat and oil-containing food in Nitrogen gas.

OR

Rancidity spoils those food materials that are prepared in the fats and oils which have been kept for a considerable time and make them unfit for eating.

39. **Read the text carefully and answer the questions:**

Refer to the schematic representation of albinism which is an inherited condition caused by a recessive allele (a). 'A' is the dominant allele for the normal condition. The inheritance of certain genetic traits for two or more generations is represented in a pedigree or family tree. Study the given pedigree chart and answer the following questions.




(i) X - Aa, Y - Aa

X and Y parents must have 'a allele (recessive) that is respective for albinism, the genotype of both X and Y individuals would be Aa and Aa as they are normal and 3rd generation, normal and albino male and female is formed in 3 : 1 ratio

(ii) Male - aa, Female - AA

Albinism is caused by the recessive allele. The children of generation-1, male and female all are normal (Aa). So, in generation-1, the genotype of female must be AA as she is normal and genotype of male is aa as he is albino male.

OR

Albinism is caused by the recessive allele and father of X is albino male so, the genotype of X is Aa and genotype of albino female is aa. So, the probability that their children would be albino is 50% or 0.5.